

CLAIMS

1. A pneumatic component

- having an airtight, elongated hollow body (1) made from flexible material that is capable of being charged with compressed air,
- having at least one compression member (2), extending along a surface line of the hollow body (1) and adjacent thereto that is protected against displacement and bending, also
- having at least one pair of tractive elements (4), which are secured at the two ends of the at least one compression member (2), for which purpose the compression member (2) is furnished at both ends thereof with a node (3) for reciprocal, non-positive attachment of the compression member (2) and the tractive elements (4) and for absorbing bearing forces, wherein additionally the at least two tractive elements (4) are arranged so as to wind round the hollow body (1) at least once and in opposite directions and cross each other on a surface line (7) of the hollow body (1) opposite to the compression member (2),

characterised in that

- means are integrated via which at least one of the operating parameters pressure in the hollow body (1), length of the compression member (2), or length of the tractive elements (4) may be altered electrically.

2. The pneumatic component as cited in claim 1,  
characterised in that
  - means are integrated via which pressure  $p_1$  in the hollow body (1) can be altered electrically.
3. The pneumatic component as cited in claim 2,  
characterised in that
  - the hollow body (1) is furnished in the interior thereof with a gas-impermeable, flexible bladder (12) with a smaller volume than that of the hollow body (1),
  - a container (9) that holds a volatile liquid (10) is installed inside the bladder (12),
  - a heat pump (13) with reversible heat flow direction is present, via which the liquid (10) can be heated or cooled, and one side of which is in thermal contact with the liquid (10) and the other side of which can exchange heat with the exterior outside of the bladder (12),
  - the change in pressure can be brought about by electrothermal means with liquid amplification.
4. The pneumatic component as cited in claim 3,  
characterised in that
  - at least one electrical gas pressure sensor (14) is located inside the bladder (12).
5. The pneumatic component as cited in claim 4,  
characterised in that
  - the bladder (12) is produced from a flexible, low-expansion material.
6. The pneumatic component as cited in claim 4,

characterised in that

- the bladder (12) is made from elastic material.

7. The pneumatic component as cited in claim 1,  
characterised in that

- the compression member (2) contains means for altering the length thereof electrically.

8. The pneumatic component as cited in claim 7,  
characterised in that

- the means for altering the length of the compression member (2) include at least one actuator based on electroactive ceramic (EAC).

9. The pneumatic component as cited in claim 8,  
characterised in that

- the at least one EAC actuator used is a stack actuator (17), which is to say several EAC actuators (18) arranged in series.

10. The pneumatic component as cited in claim 1,  
characterised in that

- the tractive element (4) contains means for altering the length thereof electrically.

11. The pneumatic component as cited in claim 10,  
characterised in that

- the means for altering the length of the tractive element (4) include at least one actuator based on electroactive polymers (EAP).

12. The pneumatic component as cited in claim 11,  
characterised in that

- the at least one actuator is made from multilayer EAP.

13. The pneumatic component as cited in either of claims 7 or 10,  
characterised in that
  - the means for changing the lengths of compression member (2) and tractive elements (4) are piezoelectric linear motors.
14. The pneumatic component as cited in any of claims 7 to 13,  
characterised in that
  - at least one sensor is present for measuring the change in length of the compression member (2) and the tractive elements (4).
15. The pneumatic component as cited in any of claims 4 to 6 or 14,  
characterised in that
  - an electrical controlling and regulating circuit (23) is present, which is connected to the sensors and actuators of the component, and with the aid of which the operating parameters of the component can be monitored and altered.
16. The pneumatic component as cited in any of claims 2 to 6 and 7 to 9,  
characterised in that
  - means for altering the pressure  $p_1$  in the hollow body (1) and means for altering the length of the compression member (2) electrically are present simultaneously.
17. The pneumatic component as cited in any of claims 2 to 6 and 10 to 12,  
characterised in that
  - means for altering the pressure  $p_1$  in the hollow body (1) and means for altering the length of the

tractive elements (4) electrically are present simultaneously.

18. The pneumatic component as cited in any of claims 2 to 6 and 7 to 9 and 10 to 12, characterised in that
  - means for altering the pressure  $p_1$  in the hollow body (1), means for altering the length of the compression member (2), and means for altering the length of the tractive elements (4) electrically are present simultaneously.
19. The pneumatic component as cited in any of claims 2 to 6, characterised in that
  - the bladder (12) is furnished with thermal insulation.
20. The pneumatic component as cited in any of claims 2 to 6, characterised in that
  - the heat pump (13) is a Peltier element.